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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
SPECIFICATION FOR
COTTON CALICO FOR ELECTRIC CABLES
(*First Revision*)

UDC 677.21.064.1 : 621.315.2



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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR COTTON CALICO FOR ELECTRIC CABLES (First Revision)

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Indian Standard

SPECIFICATION FOR COTTON CALICO FOR ELECTRIC CABLES (*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 31 January 1984, after the draft finalized by the Industrial Textiles Sectional Committee had been approved by the Textile Division Council.

0.2 This standard was first published in 1965. It has now been revised to make it up-to-date. Three more varieties of the cloth have been included apart from using SI units.

0.3 Cotton calico conforming to this standard is used in covering insulated core and binder of electric cables. The cloth is proofed with a rubber compound on one side. It is then cut into narrow strips and wound on the cores. Generally, the cloth is printed all over with the cable manufacturer's name.

0.4 The requirements of cotton calico given in this specification are for the basic cloth only and not for the proofed cloth.

0.5 The Standards of Weights and Measures Act, 1976 stipulates use of International System of Units in the country.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes constructional details and other requirements of cotton calico, grey or scoured, used in the manufacture of electric cables.

*Rules for rounding off numerical values (revised).

1.2 This standard does not specify the general appearance, feel, etc, of the cloth (*see also 3.3*).

2. GENERAL REQUIREMENTS

2.1 Yarn — The yarn used in the manufacture of the cloth shall be of cotton and of the quality required to ensure that the cloth complies with the requirements of this standard. It shall be satisfactory in evenness and reasonably free from neps and spinning defects.

2.2 Cloth

2.2.1 The cloth shall be woven in plain weave.

2.2.2 The cloth shall be free from substances that are likely to have deleterious effect when applied on the cable.

2.2.3 The cloth shall be calendered.

2.2.4 The cloth may be printed all over with the cable manufacturer's name and any other information as agreed to between the buyer and the seller.

2.2.5 The cloth, when visually examined, shall be reasonably free from weaving flaws.

3. SPECIFIC REQUIREMENTS

3.1 Construction — The cloth shall comply with the requirements of Table 1. The count of yarn given in Table 1 is for guidance only.

3.2 The cloth shall also conform to the requirements given in Table 2.

3.3 Sealed Sample — If in order to illustrate or specify the general appearance, feel, etc, of cloth, a sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.

3.3.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

4. MARKING

4.1 The cloth shall be marked with the following:

- a) Name of the material;
- b) Manufacturer's name, initials or trade-mark;
- c) Width and length of the piece; and
- d) Month and year of manufacture.

**TABLE 1 CONSTRUCTIONAL PARTICULARS OF COTTON CALICO, GREY OR SCAURED,
FOR ELECTRIC CABLES**

(Clause 3.1)

| VARI- ETY No. | COUNT OF YARN | | ENDS/ dm | PICKS/ dm | MASS | | THICK- NESS, Max | BREAKING LOAD ON 5.0 × 20 cm STRIPS, | | WIDTH | LENGTH | |
|----------------------------|----------------|------|-----------------|------------------|---------------------|-----------------|------------------------|---|--------------------------|----------------|--------|---------|
| | Warp | Weft | | | Grey | Scoured | | Min | Warpway | | | Weftway |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | | |
| | | | | g/m ² | g/m ² | mm | N | N | cm | m | | |
| 1. 10 tex (59s) | 10 tex (59s) | 283 | 283 | — | 58 | 0.12 | 200 | 180 | } 100 or as agreed | } As agreed | | |
| 2. 12 tex (49s) | 12 tex (49s) | 250 | 210 | 60 | 56 | 0.15 | 196 | 147 | | | | |
| 3. 16 tex (37s) | 16 tex (37s) | 230 | 205 | 75 | — | 0.20 | 216 | 167 | | | | |
| 4. 30 tex (20s) | 30 tex (20s) | 200 | 190 | 123 | — | 0.30 | 245 | 196 | | | | |
| TOLER- ANCE, PERCENT | — | — | ±2 | +5 -2.5 | +5 -2.5 | — | — | — | ±2 | — | | |
| METHOD OF TEST | — | — | IS : 1963-1981* | IS : 1964-1970† | IS : 7702- 1975‡ | IS : 1969-1968§ | IS : 1954-1969 | | | | | |

NOTE 1 — The thickness shall be determined at a pressure of 1 pascal (Pa). One Pa is approximately equal to 0.102 kgf/m².

NOTE 2 — One newton (N) is approximately equal to 0.102 kgf.

*Methods for determination of threads per unit length in woven fabrics (*second revision*).

†Methods for determination of weight per square metre and weight per linear metre of fabrics (*first revision*).

‡Method for determination of thickness of woven and knitted fabrics.

§Method for determination of breaking load and elongation at break of woven textile fabrics (*first revision*).

||Methods for determination of length and width of fabrics (*first revision*).

TABLE 2 REQUIREMENTS OF COTTON CALICO, GREY OR SCoured, FOR ELECTRIC CABLES

(Clause 3.2)

| SL No. | CHARACTERISTIC | REQUIREMENT | METHOD OF TEST |
|--------|--|-------------|------------------------------------|
| (1) | (2) | (3) | (4) |
| i) | Scouring loss, percent, <i>Max:</i> | | IS : 1383-1977* (Mild method) |
| | a) Grey | 10 | |
| | b) Scoured | 2 | |
| ii) | pH value of aqueous extract | 6.0 to 8.5 | IS : 1390-1983† (Cold method) |
| iii) | Colour fastness to decatizing (for printed cloth only) | 4 or better | IS : 865-1958‡ |

*Methods for determination of scouring loss in grey and finished cotton textile materials (*first revision*).

†Methods for determination of pH value of aqueous extracts of textile materials (*first revision*).

‡Method for determination of colour fastness of textile materials to decatizing.

4.1.1 The cloth may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Institution.

5. PACKING

5.1 The cloth shall be packed in bales or cases in conformity with the procedure laid down in IS : 1347-1972* or IS : 293-1980†, as required.

*Specification for inland packaging of cotton cloth and yarn (*first revision*).

†Code for seaworthy packaging of cotton yarn and cloth (*third revision*).

6. SAMPLING

6.1 Lot — The quantity of cloth of the same variety, width and quality, delivered to one buyer against one despatch note, shall constitute a lot.

6.2 The conformity of a lot to the requirements of this standard shall be determined on the basis of tests carried out on the samples selected from the lot.

6.3 Unless otherwise agreed upon between the buyer and the seller, the number of pieces of cloth to be selected at random from a lot shall be in accordance with col 2 of Table 3.

6.4 For evaluating ends and picks, mass, thickness, width and length, the sample selected as in col 2 of Table 3 shall constitute the test sample.

6.5 For evaluating breaking load, scouring loss, pH value and colour fastness, the number of pieces of cloth specified in col 4 of Table 3 shall constitute the test sample. These pieces may be drawn from the pieces selected for the purpose of 6.4. The required test specimens shall be drawn from each of the pieces and subjected to corresponding tests.

6.6 Criteria for Conformity — The lot shall be considered to be in conformity with the requirements of this standard if the following conditions are satisfied:

- a) The number of pieces found defective with respect to ends and picks, mass, thickness and width does not exceed the corresponding number given in col 3 of Table 3.
- b) In the case of length, the length of each piece is not less than the specified, declared or marked length. If it is, the mean length of the pieces is determined and this mean length is not less than the declared value.
- c) From the observed values of the breaking load tests in respect of each piece in the test sample, the average breaking load value is calculated. From all such average values, the grand average \bar{X} and the range R is calculated and the value of the expression $\bar{X} - 0.4 R$ is found to be greater than or equal to the specified value.

NOTE 1 — The average breaking load value for a piece is the value obtained by dividing the sum of observed values in respect of the test specimens taken from the piece by the number of test specimens. The grand average \bar{X} is the value obtained by dividing the sum of the average breaking load values in respect of all the pieces in the test sample by the number of pieces tested.

NOTE 2 — The range R is the difference between the maximum and the minimum in a set of average breaking load values for the pieces tested.

- d) From the observed values of scouring loss, the average \bar{X} and the range R are calculated and the value of the expression $\bar{X} \pm 0.4 R$ is less than or equal to the specified value.
- e) From the observed pH values the average \bar{X} and the range R are calculated and the value of the expressions $\bar{X} + 0.4 R$ and $\bar{X} - 0.4 R$ lie within the specified limits.

NOTE 1 — The average \bar{x} is the value obtained by dividing the sum of the observed values by the number of tests.

NOTE 2 — The range R is the difference between the maximum and the minimum in a set of observed values.

- f) The colour fastness rating obtained on test satisfies the specified requirement.

TABLE 3 SAMPE SIZE AND CRITERIA FOR CONFORMITY

[Clauses 6.3, 6.4, 6.5 and 6.6 (a)]

| NUMBER OF PIECES IN THE LOT | SAMPLE SIZE (NUMBER OF PIECES TO BE SELECTED) | PERMISSIBLE NUMBER OF DEFECTIVE PIECES | SUB-SAMPLE SIZE (NUMBER OF PIECES TO BE SELECTED) |
|--------------------------------|--|---|--|
| (1) | (2) | (3) | (4) |
| Up to 100 | 10 | 0 | 5 |
| 101 to 300 | 15 | 1 | 6 |
| 301 to 500 | 25 | 1 | 7 |
| 501 to 800 | 35 | 2 | 8 |
| 801 to 1 300 | 50 | 3 | 9 |
| 1 301 and above | 75 | 4 | 10 |

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

| QUANTITY | UNIT | SYMBOL |
|---------------------------|----------|--------|
| Length | metre | m |
| Mass | kilogram | kg |
| Time | second | s |
| Electric current | ampere | A |
| Thermodynamic temperature | kelvin | K |
| Luminous intensity | candela | cd |
| Amount of substance | mole | mol |

Supplementary Units

| QUANTITY | UNIT | SYMBOL |
|-------------|-----------|--------|
| Plane angle | radian | rad |
| Solid angle | steradian | sr |

Derived Units

| QUANTITY | UNIT | SYMBOL | DEFINITION |
|----------------------|---------|--------|---------------------------------|
| Force | newton | N | 1 N = 1 kg.m/s ² |
| Energy | joule | J | 1 J = 1 N.m |
| Power | watt | W | 1 W = 1 J/s |
| Flux | weber | Wb | 1 Wb = 1 V.s |
| Flux density | tesla | T | 1 T = 1 Wb/m ² |
| Frequency | hertz | Hz | 1 Hz = 1 c/s (s ⁻¹) |
| Electric conductance | siemens | S | 1 S = 1 A/V |
| Electromotive force | volt | V | 1 V = 1 W/A |
| Pressure, stress | pascal | Pa | 1 Pa = 1 N/m ² |

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Printed at Printograph, New Delhi, India